

Abstract:

Multi-decadal change of atmospheric aerosols and their effect on surface radiation

Mian Chin, Thomas Diehl, David Streets, Martin Wild, Yun Qian, Hongbin Yu, Qian Tan, Huisheng Bian, Weiguo Wang

We present an investigation on multi-decadal changes of atmospheric aerosols and their effects on surface radiation using a global chemistry transport model GOCART along with the near-term to long-term data records. We focus on a 28-year time period of satellite era from 1980 to 2007 during which a suite of aerosol data from satellite observations, ground-based measurements, and intensive field experiments have become available. Particularly:

- We compare the model calculated clear sky downward radiation at the surface with surface network data from BSRN and CMA
- We compare the model and surface data with satellite derived downward radiation products from ISCCP and SRB
- We analyze the long-term global and regional aerosol trends in major anthropogenic source regions (North America, Europe, Asia) that have been experiencing considerable changes of emissions during the three decades, dust and biomass burning regions that have large interannual variability, downwind regions that are directly affected by the changes in the source area, and remote regions that are considered to representing “background” conditions.